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Dementia Praecox Studies

THE PHYSICAL MANIFESTATIONS OF DEMENTIA PRECOX.*

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Dementia praecox is a term of rather recent origin, but it stands for a condition long recognized. It is applied to a group of insane persons whose earliest manifestations of disease appeared in adolescence. It is a condition in which we have no known etiologic moment and one in which we have discovered no adequate pathologic morphology. Therefore, we are obliged to rely entirely upon clinical manifestations for the diagnosis. Such a diagnosis is necessarily relative and its boundary is indistinct and uncertain, limited often by educational prejudice, by individual experience and by professional fashion. In spite of all this uncertainty the general nosological term "dementia praecox" to-day represents a large and generally acceptable clinical group that presumably stands for some absolutely unknown and inadequately sought pathologic entity. In different localities, in different professional neighborhoods, and at different times in the same professional group, the borders of this diagnostic category shift about to extend more or less in one direction or another, but the great and characteristic campaign of dementia praecox remains undisturbed and undisputed territory. The duration of this disease and the exacerbations and remissions that it suffers makes any description of it complicated and any composite of its phases contradictory. With such limitations, then, would we discuss some of the more recently determined physical manifestations of this disease.

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It would be useless to consider the ordinary symptoms of dementia precox. For a very long time they have been well recognized. The catatonia, the cyanosis, the infantilism, and the many secondary mental manifestations, such as negativism, mutism and impulsive outbreaks, have received only too great and exclusive attention. During the past few years a considerable number of previously unnoticed physical conditions have been brought to light. Most of these have been recognized upon the living patient, and are thus clinical in their nature. Some of them, however, have been recognized only at autopsy, and in this direction further pathologic study is necessary in order to fully interpret the clinical manifestations which are now available. Meager as these manifestations are they point conclusively to a uniform exogenous pathologic increment which should be the object of intensive research.

1. In the early periods and in the exacerbation of dementia precox, the pupils are dilated. The iris responds to light, but often contracts unequally or even irregularly in the same eye, but the pupils do not contract as they do in the well when the sclera is touched with the tip of the finger or with a glass rod (Westphal-Bumke reaction).

Since the early observation of this condition of the pupil in catatonic stupor (Deut. Med. Woch., 1907, 33, page 1080), Westphal's studies have been followed up by a great number of investigators who have not confined themselves to the insane, but have studied pupillary conditions among the sick and among normal individuals. Weiler (Zeit. f. d. g. Neur. u. Psy., 1910, pages 101-274) has investigated the condition of the movements of the iris in health and disease, and Wassermeyer and Siemerling had noticed abnormal and persistent myosis in mental diseases at a much earlier time (1896-1907). The whole subject was considered by Winter in his thesis at Bonn, 1911, and Bumke has brought together in his monograph (Pupillenstörungen bei Geistes Krankheiten) all the literature pertaining to the subject of

pupillary reaction in mental disease up to the year 1911, when it was written. Abnormalities of the pupil were noticed in hysteria, in alcoholic psychoses, and in various conditions of toxemia, as well as in all diseases involving the intracranial viscera. The failure of the iris to contract on touching the sclera does not appear in more than a small percentage of healthy individuals, and it does appear in more than 60 per cent. of the patients diagnosed as cases of dementia precox. Taken alone it is not a diagnostic sign of any great value, but taken in connection with other manifestations it is suggestive of a deep and pervading pathologic moment.

2. The blood pressure in dementia precox is uniformly low, and the subcutaneous injection of 0.5 c.cm. of adrenalin 1:1000 (Parke-Davis Company's) does not raise it, but in the great majority of cases is followed in two minutes by a fall of ten to fifteen millimeters of mercury, with a slight increase in pulse rate, continuing rapid for a half hour (Willi Schmidt reaction).

The study of adrenalin pressor activity has been carried on with great intensity during the past two years, and can hardly be appreciated without considerable experiment and extensive reading. The pressor action of adrenalin is not a stimulation in the ordinary sense; it probably depends upon the ratio of adrenalin content between the interior of the blood vessel and the surrounding lymph apparatus. It is strongly modified by certain toxic amines, especially by the so-called ergotoxin of Dale. This crude element is apparently dependent for its activity upon its containing or resembling the iminazolyethylamine. The previous injection of this substance into the animal experimented upon inhibits the action of an intravenous injection of adrenalin. Thus, a dementia precox patient reacts to adrenalin as if he had received a previous dose of ergotoxin or betaiminazolyethylamine.

The peculiar insensibility of dementia precox patients to subcutaneous injections of adrenalin was

first noticed and published by Willi Schmidt, of Freiburg, in the spring of 1914 (Muench. Med. Woch., 1914, 61, pages 366-368, and Arch. f. Psy. u. Nervheilk., 1914, 55, page 326). His work was confirmed and further extended by Neuburger (Arch. f. Psy. u. Nervheilk., 1915, 55, pages 521-526).

3. In many cases of dementia precox, both with a very low blood pressure and a blood pressure approaching normal, if the tests are made in a reclining and afterwards in a sitting or erect position, it is found that the blood pressure is lower standing than when reclining (Ludlum, Corson-White reaction).

This very remarkable observation led this research on to very efficient therapeutic measures, and we can not help but look to them for still further advances in the same direction. Their recent publication (Am. Jour. of Insanity, 1915, April, Volume 71, page 733) has not been followed out by confirmatory work by other psychiatrists, and yet in a few instances this attitude paradox has been confirmed.

4. The subconjunctival instillation of adrenalin in cases of dementia precox causes the already dilated pupil to dilate still more widely, or in a few instances to contract (Schultz reaction).

The subconjunctival instillation of adrenalin in normal individuals and most sick people produces a blanching of the mucous membrane but no pupillary change. This is also the case with experimental animals. When, however, the isolated frog's eye is used or when the ciliary ganglion or the superior sympathetic ganglion in experimental animals has been extirpated, the subconjunctival instillation of a solution of 1:1000 adrenalin produces a maximal mydriasis. Similar reactions have been observed in cases where the superior sympathetic ganglion has been destroyed by carcinoma or separated from the eye by stab wounds or surgical operations. Thus, more than 75 per cent. of the patients with a clinical diagnosis of dementia precox exhibit an adrenalin pupillary mydriasis which is similar to that observed when the

superior sympathetic has been extirpated or the ciliary ganglion excised or destroyed.

A similar reaction appears in cases of hyperglycemia and animals in which the pancreas has been excised and in human beings with peritonitis or some irritative condition in the upper peritoneal cavity. It also appears in acromegaly and many other pluriglandular disturbances.

This reaction was brought to our attention by Schultz (*Monat. f. Psy. u. Neur.*, 1915, 37, pages 205-227, and Cord's "Die Adrenalin Mydriasis," Bonn, 1911).

5. In a great number of cases of dementia precox, Lundvall and Kahlmeter have shown that there is a blood crisis, as they call it, on each exacerbation and remission. The number of red corpuscles during the progress of the disease is increased to 5,500,000, or even to 7,000,000 or 8,000,000, while the white corpuscles remain as low as 6,000 to 8,000 per cubic millimeter, when counted in the peripheral blood. Whenever a remission shows itself, the number of red corpuscles approaches the normal, while the number of white corpuscles suddenly or abruptly increases (Lundvall's Blood Crisis, Lundvall, *Am. Jour. Clin. Med.*, 1915, 22, pages 115-120, and Kahlmeter, *Chicago Med. Recorder*, 1915, 37, page 206).

6. In practically all cases of dementia precox defensive ferments are demonstrable capable of catabolizing the organ albumin of the sex gland (the testicles in the male and the ovaries in the female), and usually defensive ferments capable of catabolizing one or more of the other glands of internal secretion, especially the pancreas, the thyroid, and in the end conditions, the cerebral cortex (Fauser-Abderhalden reaction).

This reaction has led to the most careful studies of the etiology of dementia precox that have been made, and they have given rise to the most bitter discussions. Fauser's papers (*Deut. Med. Woch.*, 1913, 38, page 2446, and *Muench. Med. Woch.*, 1913, 60, page 584) opened up this subject to a most bitter

controversy, which has continued until the present time. A complete and very fair study of the subject has been made by Nieszytko, L. (*Zeit. f. d. g. Neur. u. Psy.*, 1914, 26, page 546). Although the diagnostic value of this test may not be as great as Fauser at first expected, its significance in pointing toward research and methods of investigation can not be overestimated.

These are a few of the more positive and the more easily applied tests demonstrating the pathologic conditions of this disease. They are not, however, the only ones. The studies of the toxicity of the blood and excretions have not, up to the present time, yielded such positive results that they are easily stated. It is obvious from the experiments of Benedik and Deak (*Arch. f. Psy. u. Neur.*, 1913, 51, page 209) and Laignel-Lavastine (*Arch. Gen. d. Med.*, 1914, 7, page 667) and many other research men that the blood of dementia precox patients in periods of exacerbation contain a larger amount of toxic elements than in periods of remission and that they always contain toxic elements not found in the blood of the well and other insane patients. Our methods of measuring the toxicity of animal fluids are still very uncertain and crude, while the evidence at hand is valuable and should under no circumstances be neglected. It is anything but conclusive of any specific toxic base.

The study of the pharmacologic reactions outside of a limited study of adrenalin, eserine, pilocarpine and glucose has not been sufficiently extensive to yield an interpretable result. There is great reason to believe that the low blood pressure and the adrenalin in susceptibility in dementia precox is due to an unexcreted residue of betaminazolyethylamine. This toxic base is ordinarily excreted through the liver. The early and acute symptoms of dementia precox show an erroneous and incomplete hepatic metabolism. When a toxic dose of betaminazolyethylamine is passed through an isolated liver before it is injected into an animal it is changed into a harmless salt and,

although it still produces some symptoms, its grave toxicity has disappeared.

There are a few physical manifestations of dementia precox that can not be demonstrated *in vivo*, but, as a rule, must be studied *post-mortem*.

1. The morphologic microscopic picture of the testicle in dementia precox is conclusive of a progressive destructive process or affection involving especially the seminiferous tubules, but also modifying the appearance of the chromaffin cells or the cells of Leydig (Gorrieri and Todde).

The destructive effect of the acute infectious diseases and of the other conditions was studied long ago by Herman Cordes (Untersuchungen ueber den Einfluss akuter und chronische Allgemeinen Kranken. Vir. Arch., 1898, 151, page 402). He showed that the various acute infectious diseases, such as pneumonia, erysipelas and typhoid fever, produced varying degrees of degenerative processes in the testicle.

2. The brain in dementia precox is hydrocephalic, and the brain weight is too great both for the size of the skull (Reichert) and the size and weight of the body (Southard, Am. Jour. of Insanity, October, 1914, and January, 1915, 71, pages 383 and 603).

3. Catatonia is a condition of wet brain, and if we interpret Nissl's last thesis correctly it would not be irrational to treat it by decompression (Nissl).

